

PM₁₀ SIP/Maintenance Plan Evaluation Report:
PacifiCorp Energy – Lake Side Power Plant

Utah County Nonattainment Area

Utah Division of Air Quality

Major New Source Review Section

October 1, 2015

PM₁₀ SIP/MAINTENANCE PLAN EVALUATION REPORT

PacifiCorp Energy – Lake Side Power Plant

1.0 Introduction

This evaluation report (report) provides Technical Support for Section IX, Part H.1 and Section IX, Part H.2 of the Utah Implementation Plan (SIP); to address the Utah County PM₁₀ Nonattainment Area (UCNA). This document specifically serves as an evaluation of the PacifiCorp Energy operated Lake Side Power Plant.

Note on document identification: The intention of the Utah Division of Air Quality is to develop a Maintenance Plan to address PM₁₀. As part of this effort, SIP Subsections IX.H.1 Emission Limits and Operating Practices – General Requirements, IX.H.2 Source-Specific Particulate Emission Limitations in Salt Lake and Davis Counties and IX.H.3 Source-Specific Particulate Emission Limitations for Utah County will be repealed and replaced. Subsection IX.H.4 will be repealed and replaced with Interim Emission Limits and Operating Practices. This subsection provides interim limits, consistent with the limits codified in the PM_{2.5} SIP, until future controls have been implemented within timeframes identified in Section IX Part H.2.

This evaluation report references the SIP version originally dated June 28, 1991 and made effective by EPA on August 8, 1994. This SIP version is often referred to as the “original SIP.” The Utah County portion of the SIP was further updated on June 5, 2002 and made effective by EPA on January 22, 2003. Additional SIP revisions were adopted by the Air Quality Board on July 6, 2005 and became state law on August 1, 2005. However, this version of the SIP was not adopted by EPA and therefore never became federal law. In order to distinguish between the various documents in this report, the following coding scheme will be used:

- Since Sections IX.H.1-4 of the 2005 State-only SIP will be repealed entirely, there is no need to refer to that document version within this report.
- When referencing the original SIP with an effective date of August 8, 1994 the qualifier ^{OS} will follow any citation from that document.
- In reference to the updated Utah County SIP with an effective date of January 22, 2003 the qualifier ^{UC} will follow any citation from that document.
- When referencing any new Maintenance Plan/SIP condition or requirement, the citation will be left blank.

Therefore, a particular sentence of this document might read as follows:

SIP Subsection IX.H.1.c – Stack Testing supersedes 2.a.A^{OS} from the original SIP.

1.1 Facility Identification

Name: Lake Side Power Plant

Address: 1825 N Pioneer Lane, Vineyard, Utah, Utah County

Owner/Operator: PacifiCorp Energy

UTM coordinates: 4,464,500 m Northing, 436,000 m Easting, Zone 12

1.2 Facility Process Summary

The Lake Side Power Plant (LSPP) is a natural gas-fired electric generating plant consisting of four combined-cycle turbines, four heat recovery steam generators with duct burners, two auxiliary boilers, two cooling towers, one dew point heater, two diesel-fired emergency generators, and one diesel-fired fire pump. The plant is located in Utah County, which is part of the Provo, Utah PM_{2.5} nonattainment area.

The plant is a Phase II acid rain source and a major source for PM₁₀/PM_{2.5}, NO_x, CO, VOC, HAP and GHG emissions. The source (Block #1) was originally permitted as a PSD source and a PM₁₀ non-attainment area major source. When Block #2 was added in 2011, this modification was permitted as a PSD major modification, as well as a PM₁₀ nonattainment area major modification. Therefore, analysis of LAER was required on both occasions for the facility's PM₁₀ and NO_x emissions; analysis of BACT was required for all other emissions.

At the time of installation for both Block #1 and Block #2, BACT/LAER for the turbines was dry low-NO_x burners, SCR and oxidation catalysts. The auxiliary boilers were fitted with dry low-NO_x burners. The diesel equipment is required to operate on ultra-low sulfur diesel. The cooling towers have high-efficiency drift elimination.

1.3 Facility Criteria Air Pollutant Emissions Sources

The source consists of the following emission units:

- One (1) natural gas-fired, dry low-NO_x, combined-cycle turbine – CT #1
- One (1) natural gas-fired, dry low-NO_x, combined-cycle turbine – CT #2
- One (1) natural gas-fired, dry low-NO_x, combined-cycle turbine – CT #3
- One (1) natural gas-fired, dry low-NO_x, combined-cycle turbine – CT #4
- One heat recovery steam generator, low-NO_x duct burner, 184 MMBtu/hr – HRSG #1
- One heat recovery steam generator, low-NO_x duct burner, 184 MMBtu/hr – HRSG #2
- One heat recovery steam generator, low-NO_x duct burner, 400 MMBtu/hr – HRSG #3
- One heat recovery steam generator, low-NO_x duct burner, 400 MMBtu/hr – HRSG #4
- Two (2) selective catalytic reduction systems with ammonia injection – Block #1 SCR
- Two (2) selective catalytic reduction systems with ammonia injection – Block #2 SCR
- Two (2) CO oxidation catalysts – Block #1 OxyCat
- Two (2) CO oxidation catalysts – Block #2 OxyCat
- One (1) natural gas-fired 61.2 MMBtu/hr auxiliary boiler – Aux Boiler #1
- One (1) natural gas-fired 61.2 MMBtu/hr auxiliary boiler – Aux Boiler #2
- Two (2) 1,500 hp diesel generators – Em Gen #1, #2
- One (1) 3.67 MMBtu/hr diesel-fired fuel dew point heater – Heater #1
- One (1) 290 hp diesel-fired fire pump – Pump #1
- Cooling Towers #1, #2

1.4 Facility 2011 Baseline Actual Emissions and Current PTE

In 2011, LSPP's baseline actual emissions were determined to be the following (in tons per year):

Table 1: Actual Emissions

Pollutant	Actual Emissions (Tons/Year)
PM ₁₀	31.7
SO ₂	4.18
NO _x	86.47

The current PTE values for LSPP, as established by the most recent AO issued to the source (DAQE-AN130310012-15) are as follows:

Table 2: Current Potential to Emit

Pollutant	Potential to Emit (Tons/Year)
PM ₁₀	215.4
SO ₂	55.6
NO _x	280.9

However, please see Section 2.0 (and Table 3) for further details on LSPP's PTE value.

2.0 Modeled Emission Values

Unlike the base year inventory, which used only the 2011 actual emissions for each source to set the baseline for modeling, a modified version of the PTE values was used for the modeled attainment demonstration. Beginning with the PTE values listed in Table 2 (from the most recent approval order issued to LSPP in 2015), these emissions were then “trued-up” by including the expected effects from implementation of RACT from the PM_{2.5} SIP. This true-up yields a 2019 Projected Emission Value for each of the pollutants of concern. Where necessary, these values were further corrected for condensable particulates using simple correction factors based on fuel consumed or process type.

Where gaseous fuels such as natural gas were combusted, filterable-only emissions were converted to a filterable+condensable emission value by multiplying the filterable rate by 4. For natural gas, AP-42 lists the various emission factors as:

Filterable PM: 1.9 lb/106 scf
 Condensable PM: 5.7 lb/106 scf
 Total PM: 7.6 lb/106 scf

In other words, the total PM is almost exactly four times the filterable emission value. Liquid fuels, such as diesel fuel #2, were also converted using the latest AP-42 emission factors. Processes such as cooling towers, which emit largely filterable-only emissions, were not adjusted. Other processes were adjusted, as needed, on a case-by-case basis using the best data available – primarily the latest stack test information.

For the LSPP specifically, these additional steps were not required. As LSPP is a new “greenfield” source, the AO issued to LSPP in 2005 (and modified in 2011 to add Block #2) included both the application of BACT and LAER controls – the latter level of control being applied specifically for control of PM₁₀, NO_x and SO₂ emissions. Thus, the plant was constructed with the assumption of RACT level control already in place. During the PM_{2.5} SIP process, this assumption proved true as no additional controls were imposed on this source. In addition, the source's emission limits for PM₁₀ were set with the assumption that condensable PM₁₀ was included; thus, all particulate limits are set as a filterable+condensable limit.

Therefore, for the LSPP, no change occurs between the values in Table 2 and the Modeled Emission Values listed in Table 3, as shown below:

Table 3: Modeled Emission Values

Pollutant	Potential to Emit (Tons/Year)
PM ₁₀	215.4
SO ₂	55.6
NO _x	280.9

The conditions, requirements and emission limitations contained within this maintenance plan are based on those in Sections IX.H.11-13 – which comprise the PM_{2.5} sections of the SIP. All requirements from the original PM₁₀ SIP that have not been superseded or replaced, and which are still necessary, will also be retained. By necessary, meaning: significant from the standpoint of PM₁₀ control, or in demonstrating that no backsliding in the application of RACT as viewed from the original SIP has taken place. This is discussed in greater detail in Item 3 below.

3.0 Comparison of Requirements – Original SIP and New Maintenance Plan

LSPP was never previously listed in the PM₁₀ SIP. The plant began construction in 2005, more than ten years after the original SIP issuance and approval dates. Its construction was only possible using emission offset credits obtained from the closure and demolition of the Geneva Steel plant. In fact, where the LSPP facility is physically located is where a portion of the Geneva Steel plant once resided. The Utah County updated SIP^{UC}, which still included Geneva Steel as a listed source, was issued and approved in 2002/2003, a full two years before the first permit was issued to LSPP authorizing construction.

However, LSPP is a listed source in the PM_{2.5} Section of the SIP (see SIP Section IX.H.13.c). As was discussed above in Item 2.0, all limits in this maintenance plan are based on the limits in the December 3, 2014 PM_{2.5} SIP; either in the general requirements of subsection IX.H.11 or the source specific requirements of IX.H.13.c. Therefore a comparison only of the general requirements found in the Utah County updated SIP^{UC} can be found below. For the source specific requirements, no direct comparison can be made.

3.1 Original SIP General Requirements

IX.H.1.a General Requirements^{UC}

The original SIP was a divided document, having two separate sets of General Requirements. The requirements found at IX.H.1.a^{OS} applied to the listed sources found in Utah County, while those found at IX.H.2.a^{OS} applied to the listed sources found in Salt Lake and Davis County. Those original requirements were then fully superseded with the Utah County updated SIP^{UC} issued in 2002 and made effective by EPA in January 2003. The comparison shown here is between the new maintenance plan and that most recent EPA-approved version.

1.a.A. Stack Testing^{UC} – this subsection covered the general methods and procedures for conducting stack testing. As with the original SIP, it included the establishment of a pretest conference, and the use of specific EPA test methods. However, it lacked the establishment of a pretest protocol. This subsection has since been updated and superseded by SIP subsection IX.H.1.e which serves the same purpose.

1.a.B. Annual Emission Limitations^{UC} – established that annual emissions would be determined on a rolling 12-month basis, and that a new 12 month emission total would be calculated on the first day of each month using the previous 12 months data. This subsection is no longer needed as the annual PM₁₀ standard no longer exists, and no source-specific annual SIP Caps appear in either IX.H.2 or IX.H.3 of the new maintenance plan.

1.a.C. Recordkeeping Requirements^{UC} – established that records need to be kept for all periods that the plant is in operation, for a period of at least two years, and provided upon request. This subsection has since been superseded by SIP subsection IX.H.1.c which serves the same purpose.

1.a.D. Proper Maintenance^{UC} – established that all facilities need to be adequately and properly maintained. Not needed. This is inherent in the NSR permitting program, under R307-401-4(1).

1.a.E. Definitions^{UC} – established that the definitions contained in R307 apply to Section IX.H.2. This subsection has since been superseded by SIP subsection IX.H.1.b which serves the same purpose.

1.a.F. Visible Emissions^{UC} – covered the establishment of designated opacity limitations for specified process units and/or process equipment. This subsection has since been superseded by SIP subsection IX.H.1.f which serves the same purpose.

1.a.G. Visible Emissions (cont.)^{UC} – covered the procedure by which visible emission observations would be conducted. This subsection has since been superseded by SIP subsection IX.H.1.f which serves the same purpose.

1.a.H. Unpaved Operational Areas^{UC} – established rules for treating fugitive dust with water sprays or chemical dust suppression. This requirement has been superseded by the nonattainment area fugitive dust rules of R307-309.

There were several additional subsections found in the original SIP for Utah County which did not appear in the Utah County updated SIP^{UC}. These conditions were primarily outdated and no longer applicable. For the sake of completeness, they are included below.

1.a.F. Approval Orders^{OS} – established that this subsection of the SIP superseded any previously issued AOs. No longer applicable, as this subsection of the SIP will be superseded, and no previously issued AOs are still in existence.

2.a.H. Future Modifications^{OS} – established that future modifications to the approved facilities were also subject to the NSR permitting requirements. Not needed. This is inherent in the NSR permitting program, under R307-401-3(1)(b).

2.a.K. Test if Directed^{OS} – established a definition of this term. No longer needed as this term is no longer used and the condition itself no longer applies. UDAQ has a minimum test frequency established under R307-165-2. This same rule also allows for (and requires) any additional testing to demonstrate compliance status as deemed necessary by the Director.

4.0 Discussion of Daily Emission Values

Table 4 is a comparison of annual PTE values with an expected daily (24-hour) emission value based on the short term limits found in IX.H.3.c.

Table 4: Comparison Table – New Maintenance Plan Emissions

All values in tons	SO ₂	NO _x	PM ₁₀
Annual	55.6	280.9	215.4 ^{&}
Daily (24-hr)	-	1.7	0.75

[&] includes condensable emissions

There is no short term limit established for SO₂ emissions given the low sulfur content of natural gas. The daily values listed for both NO_x and PM₁₀ include an allowance for startup and shutdown emissions. As 24-hour estimates, they are inherently higher values than simply dividing the annual emission values by 365. Also, these values are merely estimated values for comparison purposes, and are not to be viewed as SIP limitations. Those limits are found specifically in Section IX.H.3.c of the SIP.

5.0 New Maintenance Plan – General Requirements

The general requirements for all listed sources are found in SIP Subsection IX.H.1. These serve as a means of consolidating all commonly used and often repeated requirements into a central location for consistency and ease of reference. As specifically stated in subsection IX.H.1.a below, these general requirements apply to all sources subsequently listed in either IX.H.2 (Salt Lake County) or IX.H.3 (Utah County), and are in addition to (and in most cases supplemental to) any source-specific requirements found within those two subsections.

IX.H.1.a. This paragraph states that the terms and conditions of Subsection IX.H.1 apply to all sources subsequently addressed in the following subsections IX.H.2 and IX.H.3. It also clarifies that should any inconsistency exist between the general requirements and the source specific requirements, then the source specific requirements take precedence.

IX.H.1.b States that the definitions found in State Rule 307-101-2, Definitions, apply to SIP Section IX.H. Since this is stated for the Section (IX.H), it applies equally to IX.H.1, IX.H.2 and IX.H.3.

IX.H.1.c This is a recordkeeping provision. Information used to determine compliance shall be recorded for all periods the source is in operation, maintained for a minimum period of five (5) years, and made available to the Director upon request. As the general recordkeeping requirement of Section IX.H, it will often be referred to and/or discussed as part of the compliance demonstration provisions for other general or source specific conditions.

IX.H.1.d Statement that emission limitations apply at all times that the source or emitting unit is in operation, unless otherwise specified in the source specific conditions listed in IX.H.2 or IX.H.3.

This is the definitive statement that emission limits apply at all times – including periods of startup or shutdown. It may be that specific sources have separate defined limits that apply during alternate operating periods (such as during startup or shutdown), and these limits will be defined in the source specific conditions of either IX.H.2 or IX.H.3.

Conditions 1.a, 1.b and 1.d are declaratory statements, and have little in the way of compliance provisions. Rather, they define the framework of the other SIP conditions. As condition 1.c is the primary recordkeeping requirement, it shall be further discussed under item 4.2 below.

IX.H.1.e This is the main stack testing condition, and outlines the specific requirements for demonstrating compliance through stack testing. Several subsections detailing Sample Location, Volumetric Flow Rate, Calculation Methodologies and Stack Test Protocols are all included – as well as those which list the specific accepted test methods for each emitted pollutant species (PM₁₀, NO_x, or SO₂). Finally, this subsection also discusses the need to test at an acceptable production rate, and that production is limited to a set ratio of the tested rate.

These stack testing requirements supersede those found in IX.H.1.a.A^{OS} and IX.H.2.a.A^{OS} of the original SIP.

IX.H.1.f This condition covers the use of CEMs and opacity monitoring. While it specifically details the rules governing the use of continuous monitors (both emission monitors and opacity monitors), it also covers visible opacity observations through the use of EPA reference method 9.

These requirements specifically supersede those found in IX.H.1.a.C^{OS} and IX.H.2.a.C^{OS} of the original SIP. The original SIP requirements of IX.H.1.a.B^{OS} and IX.H.2.a.B^{OS}, both of which addressed individual equipment opacity, will be superseded as necessary by the particular source specific limitations found in IX.H.2 or IX.H.3.

Both conditions 1.e and 1.f serve as the mechanism through which sources conduct monitoring for the verification of compliance with a particular emission limitation. All conditions in these subsections are strictly in accordance with EPA approved methods and guidelines.

5.1 Monitoring, Recordkeeping and Reporting

As stated above, the general requirements IX.H.1.a through IX.H.1.f primarily serve as declaratory or clarifying conditions, and do not impose compliance provisions themselves. Rather, they outline the scope of the conditions which follow – either in the Petroleum Refinery provisions of IX.H.1.g, or the source specific requirements of IX.H.2 and IX.H.3.

For example, most of the conditions in those subsections include some form of short-term emission limit. This limitation also includes a compliance demonstration methodology – stack test, CEM, visible opacity reading, etc. In order to ensure consistency in compliance demonstrations and avoid unnecessary repetition, all common monitoring language has been consolidated under IX.H.1.e and IX.H.1.f. Similarly, all common recordkeeping and reporting provisions have been consolidated under IX.H.1.c.

5.2 Discussion of Attainment Demonstration

As is discussed above in Items 5.0 and 5.1, these are general conditions and have few if any specific limitations and requirements. Their inclusion here serves three purposes. 1. They act as a framework upon which the other requirements can build. 2. They demonstrate a prevention of backsliding. By establishing the same or functionally equivalent general requirements as were included in the original SIP, this demonstrates both that the original requirements have been considered, and either retained or updated/replaced as required. 3. When a general requirement

has been removed, careful consideration was given as to its specific need, and whether its retention would in any way aid in the demonstration of attainment with the 24-hr standard. If no argument can be made in that regard, the requirement was simply removed.

6.0 New Maintenance Plan – LSPP Specific Requirements

The LSPP specific conditions in Section IX.H.3 address those limitations and requirements that apply only to the LSPP Power Plant in particular.

IX.H.3.c.i This condition lists the specific requirements applicable to Block #1 Turbine/HRSG Stacks.

Subparagraph A: Emissions of NO_x shall not exceed 14.9 lb/hr on a 3-hr basis.

Subparagraph B: Compliance with the above conditions shall be demonstrated as follows:

I. NO_x monitoring shall be through use of a CEM as outlined in IX.H.1.f

IX.H.2.c.ii This condition lists the specific requirements applicable to Block #2 Turbine/HRSG Stacks.

Subparagraph A: Emissions of NO_x shall not exceed 18.1 lb/hr on a 3-hr basis.

Subparagraph B: Compliance with the above conditions shall be demonstrated as follows:

I. NO_x monitoring shall be through use of a CEM as outlined in IX.H.1.f

IX.H.2.j.iii This condition lists the startup/shutdown emission minimization plan requirements applicable to all three combustion turbines. The requirement also includes a definition of startup, shutdown, and a limit on total hours of operation (2) in startup or shutdown mode, per turbine, per day.

Subparagraph A: Limits applicable to Block #1 – total starts and shut down not to exceed 14 hours per day per turbine and 613.5 hours per 12-month rolling period, total NO_x emissions from the Block #1 Turbine/HRSG Stacks shall not exceed 25 ppmvd at 15% O₂, transient load excursions limited to 160 hours per 12-month rolling period.

Subparagraph B: Limits applicable to Block #2 – total starts and shut down not to exceed 8 hours per day per turbine and 553.6 hours per 12-month rolling period, total NO_x emissions from the Block #2 Turbine/HRSG Stacks shall not exceed 25 ppmvd at 15% O₂, transient load excursions limited to 160 hours per 12-month rolling period.

Subparagraph C: Definitions – Startup, shutdown, transient load conditions, and a definition of operating day.

6.1 Monitoring, Recordkeeping and Reporting

Monitoring for IX.H.2.c.i.A and B is specifically outlined in IX.H.2.j.i.c; while IX.H.2.j.ii.A and B is addressed in IX.H.2.j.ii.C. Stack testing for PM₁₀ is conducted annually, while NO_x monitoring is covered by CEM. Procedures for PM₁₀ testing are addressed under IX.H.1.e. CEM monitoring requirements are found in IX.H.1.f. Recordkeeping is subject to the requirements of IX.H.1.c.

6.2 Discussion of Attainment Demonstration

LSPP is primarily a source of NO_x and direct PM₁₀ emissions. While some SO₂ emissions are added to the overall contribution from LSPP, it is a listed source because of NO_x and PM₁₀.

Although not listed in the original PM10 SIP, and not included in the Utah County updated SIP, the LSPP remains viable within the maintenance plan through R307-403-5 – Offsets: PM10 Nonattainment Areas. When the LSPP was originally authorized for construction, and again during the 2011 expansion to install Block #2, the owner/operator PacifiCorp Energy was required to produce and use emission offset credits as outlined under R307-403-5(1)(b).

Specifically, as both the initial installation and the expansion were both larger than the 50 ton per year threshold listed in that rule, the offset credits needed to be obtained at a ratio of 1.2:1. These offset credits also satisfied the emission offsetting requirement of 40 CFR 51.165(a)(9)(i). The emission offset credits used were generated from the closure of the Geneva Steel plant (emission credit pedigree available upon request); a source listed in both the original SIP and the Utah County updated SIP. Therefore, the emission increase associated with the installation of the LSPP was already included in the background emissions of the airshed and at a greater emissions ratio.

7.0 Implementation Schedule

For the most part, the requirements imposed on the LSPP are effective immediately. While some provision was made for sources generally to implement the RACT requirements of the PM2.5 SIP (and which were included as part of the modeled emission values for each source as discussed in that section above), the LSPP did not have any required RACT modifications to undertake. The emission limits listed in IX.H.3.c can be applied immediately. Similarly, the provisions of IX.H.1.a-f (the General Requirements) can also be applied immediately.

8.0 References

Evaluation Report – LSPP Power Plant

UTAH PM₁₀ SIP/MAINTENANCE PLAN

Salt Lake County Nonattainment Area

Supporting Information